

Before the  
FEDERAL COMMUNICATIONS COMMISSION JAN 9 1989  
Washington, D.C. 20554

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In the Matter of

Advanced Television Systems  
and Their Impact on the Existing  
Television Broadcast Service

) MM Docket No. 87-268

Review of Technical and Operational  
Requirements Part 73-E. Television  
Broadcast Station

Reevaluation of the UHF Television  
Channel and Distance Separation  
Requirements of Part 73 of the  
Commission's Rules

REPLY COMMENTS OF ZENITH ELECTRONICS CORPORATION

After reviewing many of the comments filed in response to the  
Further Notice, Zenith urges the Commission to

- Keep its focus on the preeminent issues in this Proceeding - choice of an ATV system for terrestrial broadcast and the associated spectrum requirements;
- Keep an open mind, resisting pleadings and internal temptations to make premature decisions which prejudge either the system or the spectrum questions, which are inextricably interdependent;
- Allow the Advisory Committee and industry process which the Commission has set in motion to go full course through the planned study, testing and evaluation phases;

O+H

- Recognize that the life-time and time schedule set out for the Advisory Committee match neither the general state of system development nor the testing task ahead, and take steps to assure that the Committee can complete its work in a meaningful way.

In the Reply Comments which follow, Zenith refrains from general rebuttal to system advocacies. The record before the Commission and Advisory Committee will be clarified by testing and more balanced and systematic analysis than contained in the various comments.

There appears to be sufficient unanimity, and positions well-stated, on key issues to make reinforcing comment unnecessary, including: inadequacy of present data and studies on spectrum; continuing the spectrum status quo and avoiding premature decisions; the need for a full sequence of test results, Advisory Committee analysis and recommendation and Commission system choice, followed by spectrum decisions and allocation plans; one mandatory terrestrial standard; competitiveness with other media.

We do address several topics of broad interest and several specifics which bear on the Zenith HDTV simulcast proposal.

### Advocacy and Undue Recommendations

The various comments are replete with advocacy, as they should be, of various positions on spectrum and ATV system issues. Zenith and most commenters, even as advocates, ask the Commission to wait on all substantive decisions, recognizing the woefully incomplete record on both the spectrum capability to accommodate ATV allocations and on all aspects of the performance of all proposed ATV systems.

However, Zenith finds a great difference between being a vigorous advocate and overzealously proposing that the Commission should act now to drastically narrow choices. As an example in point: one of the system proponents states the "Commission can safely decide now" on several general tenets, the sum of which would eliminate virtually every other contending system.<sup>1</sup> Similarly, land mobile (LM) interests suggest that submission of untested ATV system proposals, which appear friendly to land mobile use of UHF, are sufficient justification to make LM assignments in UHF before a system is chosen.<sup>2</sup>

<sup>1</sup> Comments of North American Philips at p 32 and repeated at p iii.

<sup>2</sup> Comments of Mobile Communications Division of TIA at Executive Summary and Conclusion.

We believe these and similar undue recommendations misjudge the Commission and staff and the process on which they have embarked. Nonetheless, it causes us to endorse W.F. Schreiber: "In evaluating advice received, the Commission is requested to take account of the financial interests of the advising parties."<sup>3</sup> It should especially beware of self-interest pleadings for near term action.

#### Near Term Spectrum Decisions

The record contains no evidence that the ATV performance needs of terrestrial broadcasting can be met without supplemental spectrum. There is nothing in preliminary spectrum studies or system data to support a conclusion now that the UHF/VHF spectrum can accommodate any of the ATV proposals requiring supplemental spectrum, let alone support land mobile allocations in addition. Thus, there can be no benefit in near term decisions on allocation scenarios:

- Even if such decisions are to be made, land mobile must necessarily stay on hold or be denied.

<sup>3</sup> Comments of W. F. Schreiber, M.I. T., at p 4.

- Premature decisions, rather than expediting development of spectrum-efficient technology (which is already receiving highest priority), are more likely to foreclose promising proposals in favor of equally unproven alternatives before comparative evaluations are made.

Zenith agrees with PBS: "...the public interest is far better served if technological developments drive regulation of the communications industry than by attempts to force technology to develop in a regulatory straitjacket."<sup>4</sup>

#### Compatibility and Continued NTSC Service

The ambiguous treatment and, in some cases, misrepresentation accorded the subject of compatibility and continued service to NTSC receivers is substantive and merits comment. For necessary background we consider first the positions taken by the FCC and the Advisory Committee.

<sup>4</sup> Comments of PBS and NAPTS at p 7-8.

In the Further Notice, the Commission carefully states its tentative finding that "existing service to viewers utilizing NTSC receivers must be continued irrespective of the actual manner in which ATV services are delivered, at least during a transition period" and continues that this can be done by a receiver-compatible system or by simulcast. And the Commission gives a definition: "Compatibility: in the context of this proceeding, usually refers to the ability of a NTSC receiver to receive and display an ATV signal ....".<sup>5</sup>

The Advisory Committee in its Interim Report, issued before the Further Notice, is considerably less precise in language, but clearly anticipates and endorses the same finding: "During such a transitional period, the Advisory Committee also believes that it is essential that compatibility with existing NTSC receivers be maintained ... compatibility may be achieved through one channel systems or, in multichannel arrays, by either augmenting NTSC signals with high definitional information or by simulcasting an NTSC channel with a non-compatible HDTV signal."<sup>6</sup>

<sup>5</sup> Further Notice at 4, finding no. 4, and Appendix C.  
<sup>6</sup> FCC Advisory Committee Interim Report at p 7.

And, referring to NTSC compatibility and simulcast, "Both of these methods would be "compatible" in the sense that existing television receivers could continue to be serviced by an NTSC signal."<sup>7</sup>

Against this background, Thomson and Sarnoff comments misrepresent the Interim Report, crediting the Advisory Committee with the "conclusion", taken out-of-context, that "compatibility with existing NTSC receivers is essential."<sup>8</sup>

Additional commenters are imprecise in using the word "compatibility" in describing the Commission's finding, though they properly treat the finding elsewhere. An example is found in Sony comments: "... the tentative ruling of the FCC that an ATV service must be compatible with the existing NTSC service ..."<sup>9</sup> Much later, Sony discusses the correct tentative decision, presenting a thoughtful analysis of the simulcast option and the need to carry out the comparative test programs.<sup>10</sup>

<sup>7</sup> Ibid at p 6.

<sup>8</sup> Comments of Thomson Consumer Electronics at p 5, and Comments of David Sarnoff Research Center at p 6. Thomson, later at p 15, "concurs with the Commission that the ATV signal must be compatible with NTSC receivers"!

<sup>9</sup> Sony comments at p 18 and a related statement near the top of p 22.

<sup>10</sup> Ibid at pp 30-33.

NTIA comments are an enigma on this subject. They state:

"The Commission should make clear that it will select a broadcast transmission standard that will permit the continued use of current television sets for reception of terrestrial broadcasts. If the broadcaster is either sending two signals or is transmitting a single signal, the receiver should be capable of decoding the NTSC portion of the signal without significant degradation of the current NTSC picture and sound. Thus the Commission should establish a transmission standard for ATV that "builds on" the NTSC standard. NTSC compatibility is the most practical way for ATV to be introduced because it will not make existing receivers obsolete."<sup>11</sup>

NTIA takes no cognizance of the Commission's preliminary findings in this (or any other) area, or of the questions intended to solicit justification of responses, or of the continuing evolution of simulcast in these Proceedings as a viable approach. While the words of the NTIA comments seem to advocate "receiver compatibility", there is nothing in the filing to preclude simulcast or present cogent reasons for a preference.

#### Spectrum Efficiency and Simulcast

We are pleased that a number of respondents acknowledge simulcast as a possible ATV solution and acknowledge the possibility that, in such a scenario, NTSC might someday be abandoned.<sup>12</sup> They all, of course, want to see test results on

<sup>11</sup> NTIA comments at pp 8, 9.

<sup>12</sup> Among these are NCTA, NAB, Joint Broadcasters, CBS.

HDTV performance and spectrum compatibility. Certainly so do we, and Zenith is working diligently toward that end.

Several proponents of compatible systems, on the other hand, make much of a purported inability to find additional spectrum now for any ATV purpose (Sarnoff, Thompson). Some also claim the spectrum inefficiency of simulcast (Thomson, NAP): e.g., "In the foreseeable future, any approach which uses 12 MHz per broadcaster ... would be wasteful of the spectrum."<sup>13</sup>

Zenith submits that the root of TV and ATV spectrum inefficiency is the NTSC system and associated allocations. (Each UHF channel allocation results in a restriction of up to 14 other UHF allocations.) Every ATV proposal which retains NTSC service without use of converters retains the associated spectrum inefficiency. Zenith proposes to simulcast HDTV in a manner which recovers productive use of UHF and VHF channels which have been caused to lie fallow for generations, channels in which the Land Mobile Advisory Committee did not demonstrate satisfactory LM interference compatibility. We believe studies and tests will show these channels can be made available at the start of the new service so all present broadcasters who wish to do so can promptly participate in ATV.

<sup>13</sup> North American Philips comments at p 9.

Spectrum efficiency is multi-dimensional. In addition to how many MHz and which MHz and when, spectrum efficiency must also be measured by the effectiveness of the service provided - service area and service quality. The Zenith proposal is intended to provide spectrum compatible HDTV to the full NTSC service area while improving quality of reception, by reducing perceived noise and transmission defects, which if retained at NTSC levels, can obscure HDTV benefits. In making the power reductions inherent in the Zenith transmission coding, the equivalent effective radiated power of the analog picture content is not reduced, and can in fact be increased to improve signal-to-noise ratio performance at the receiver.<sup>14</sup> In addition, digital coding of low frequency content and other signal processing to achieve

<sup>14</sup> The Further Notice at paragraph 88 speculates "use of additional spectrum might necessitate a significant reduction in the ATV service area....". Sarnoff comments at p 12 state: "All the preliminary studies clearly indicate that the effective radiated power of any supplemental ATV signals must be substantially lower than that of existing stations." Sarnoff drew this conclusion from a simplistic interpretation of data in certain of the preliminary spectrum papers; Sarnoff obviously did not consider the implications of the Zenith proposal. We concur that peak and average radiated power must be lower to control interference. However, the information-carrying or picture portion of the radiated signal, and thus the covered service area and quality, need not be lower. In fact, HDTV will require increased information-carrying capability to enable equivalent to NTSC signal-to-noise ratio perception at the reduced viewing distances anticipated for HDTV, without reduction in service areas. This increase in signal integrity without reduction in service area is not realizable if the inefficient NTSC transmission system is retained for the main channel independent of the augmentation scheme and bandwidth used.

spectrum interference compatibility will also reduce displayed noise and transmission defects.<sup>15, 16</sup>

Thus in the real world, contrasted with the simplistic world of  $6 + 6 = 12$  arithmetic, the Zenith proposal can hardly be labeled spectrum inefficient, even in the near term or if NTSC is never phased out.

#### Comments Related to Mandatory Receiver Standards

Several commenters recommend the Commission enact mandatory receiver standards or specifications on topics ranging from cross-media inter-operability to interference characteristics of future ATV receivers. Others suggest the Commission should urge/encourage industry and other media to accomplish interoperability. Still another group of commenters state that the interested parties and the marketplace will respond to this agreed need.

<sup>15</sup> Comments of Capital-Cities/ABC and W.F. Schreiber both recognize the importance of reducing noise and transmission defects in the display, together with the potential to accomplish this with new transmission coding in simulcast.

<sup>16</sup> Concern with the question of HDTV picture quality and noise, together with new transmission system opportunities, led Zenith to suggest that the TV Planning Factors will eventually need to be reexamined. (Zenith comments at p 24.)

Zenith shares the latter two positions and further believes it is premature to make judgments as to the necessity of receiver standards, the problems to be solved, or the progress therein. Some system proposals, Zenith's among them, facilitate ATV carriage by other media, with transcoding to an FM format when that is appropriate, but with the same basic baseband signal processing as used for terrestrial broadcast. We believe manufacturers and the marketplace needs will ensure availability of models to meet the varied cost, convenience, interoperability and performance requirements of consumers. Industry activity is already laying the groundwork for voluntary interface standards, where that is a useful answer.

Should the Commission be persuaded at a future time that receiver standards may be needed in some performance area, Zenith believes this should be the subject of a new docket and separate proceedings.

We respond to one specific comment: MST attributes to the ATV Advisory Committee Interim Report the "suggestion that the Commission require all ATV receivers to be equipped with

component video inputs."<sup>17</sup> The origins of this assertion appear to be paragraph 130 of the Further Notice, the Executive Summary of the Interim Report, and, ultimately, Working Party 1 of the Planning Subcommittee. That Working Party is reported at paragraph 130 to "recommend that all ATV receivers be required..." (emphasis added).

The actual action of PS-WP1 as reported in its minutes was:

"The Committee agreed that there is a definite need to define a universal video interface, such as (Y,C), so that multiple systems could easily be interfaced to the first receivers. These receivers should also have a limited multisync capability."<sup>18</sup>

The position taken by the Advisory Committee is given in the Interim Report and is not an endorsement of Commission-imposed receiver requirements:

"...the Committee believes that expeditious consideration should be given to the achievement of effective and inexpensive ATV interfaces between broadcast and non-broadcast media. ...The Advisory Committee is continuing to examine options and alternatives in this important area, including the costs and benefits thereof, as well as the appropriate roles of government and industry in implementing various (cross-media) compatibility proposals."<sup>19</sup>

<sup>17</sup> MST comments at p 14.

<sup>18</sup> Planning Subcommittee Working Party 1, Minutes of 12 Jan 1988 meeting, PS/WP1-001

<sup>19</sup> FCC Advisory Committee Interim Report at p 9.

- 19 1988 meeting, PS/WP1-001  
FCC Advisory Committee Interim Report at p 9.

Timetable for the Advisory Committee  
and Definitive Decisions by the Commission

The charter of the Advisory Committee called for a substantive report in 6 months (including "recommendations on fundamental parameters and spectrum requirements") and established a life-time of two years, to September 30, 1989. The October 1987 charter notwithstanding:

- Definitive development of then-known system proposals continues today and at least one significant new proposal was made nearly a year into the work of the Committee.
- The first system presentations and dialog under the auspices of the Advisory Committee took place only last November, more than 13 months into the work of the Committee.
- Testing laboratories are yet to be operational; first system prototypes for test may begin to be available in mid-1989. Testing will certainly continue into 1990.

- The overwhelming weight of comments advises the Commission and the Advisory Committee that definitive and responsible spectrum recommendations and decisions must await results of tests and further studies, and progress on system selection and consensus. ATV spectrum requirements and allocation options are wholly dependent on the technical and interference parameters of the ATV system to be broadcast.

Zenith joins other commenters, who perceive these same facts, in urging the Commission to ensure the Advisory Committee has the time to complete its work in a responsible and meaningful way. That intent should be promptly stated so the Committee can use its time and industry manpower most effectively.

It is already clear that neither the Advisory Committee nor the Commission can have by September 1989 the information to make critical recommendations and decisions on system and spectrum issues. A summer 1989 effort to fabricate an Advisory Committee "final" report from whole cloth, instead of waiting for the study and test pieces, can only be frustrating, divisive, inconclusive and wasteful. Generation of even a straightforward progress report (already begun for the Second Interim Report due in April 1989) seriously dilutes the forward-going work of the Working

Parties and, perhaps more importantly, of companies which provide manpower from ATV development resources to carry out the work of the Advisory Committee. Some of the questions being studied and asked are before their time. PBS comments that the Commission's "resources and those of the affected industries would be put to far better use in testing the various ATV systems and assuming the results of those tests" apply equally to the work of the Advisory Committee, as does Commissioner Quello's observation that hypothetical situations result in hypothetical questions which are most likely to receive; at best hypothetical answers.<sup>20</sup> We believe the present time constraints are unnecessary, counterproductive, and will not advance a worthy decision process.

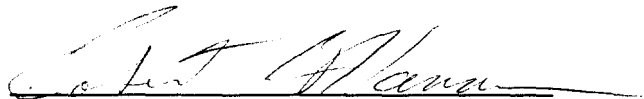
<sup>20</sup> Comments of PBS and NAPTS at pp 9, 10.

Zenith recommends that the Commission confirm its intention to develop the information and recommendations necessary for wise and accepted decisions through the Advisory Committee and the process set in motion 15 months ago. The Commission should ask the Advisory Committee to recommend a new time schedule for the expedited completion of its work, given the realities of system development, information collection, testing, and evaluation of results.

Respectfully submitted,

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